

Strategy and Policy in the Food System: Emerging Issues

EDITED BY

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*Proceedings of NE-165 Conference
June 20-21, 1996
Washington, D.C.*

**PART THREE: Are Food Marketing
Systems in North America and the
European Union Converging?**

**12. Comments on the
Convergence Hypothesis**

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Keywords: Food industry, technology, market convergence, European Union

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Comments on the Convergence Hypothesis

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The purpose of these comments is to show how the theme of this roundtable could favour new insights and suggest interesting research issues about food systems evolution. The Roundtable is to discuss whether food manufacturing and distribution systems in advanced countries are converging. I will argue that it is useful to distinguish between two different notions of convergence, namely a “broad” and a “narrow” notion of convergence.

My contribution is organized as follows. In the first section, I start with the notion of *broad* convergence by making some brief comments about the usefulness of the approaches based on this notion of convergence. Then, I will focus on the notion of *narrow* convergence. I show how such a notion might provide new insights and enlarge our directions of research. In section 3, I explore the issue of convergence in research and development expenditures of food industries in OECD countries. I will give two single examples to illustrate the usefulness of an approach based on the idea of narrow convergence. The concluding section provides further comments and indicates some avenues for future research that seem particularly worthwhile.

The Notions of Convergence

In what sense should economists interested in understanding food systems approach the issue of convergence? How could we develop conceptual and theoretical frameworks to analyze such an issue?

The first way to explore this theme is also the most common. It consists of looking for the existence of similar patterns in different countries. This approach, generally implicitly, is based on a broad notion of convergence. It relies and focuses on the existence of similar trends in different countries without any reference to the issue of the rate of convergence in the variables of interest.

This kind of convergence is a well-known empirical phenomenon. In all advanced countries, for example, one can observe an increasing demand for convenience foods, a positive trend in the willingness to pay for new and vertically differentiated products, an increasing preference for variety, and concern for food safety, nutrition, and health. As a result, one can generally observe a decrease in consumption of some products high in saturated fats while the consumer demand tends to increase for low-fat, low-calorie products (Senauer et al. 1991, Galizzi and Venturini 1996).

We know that several forces influence these changes in food consumption patterns. And we know that, by and large, the same basic factors are at work in all countries. Of course, similar changes in final demand conditions result in similar consequences for firms’ strategies. On one hand, these changes contribute to increase the consumers’ willingness to accept and pay for innovation. On the other hand, the increasing demand for convenience, quality, variety, nutritional, and health characteristics sends signals and creates incentives which induce manufacturers to launch new products.

Several authors have investigated the convergence of food expenditure patterns (see, for example, Blandford 1984, Wheelock and Frank 1989). More recently, Connor (1994) has focused the attention on the existence of convergence in the determinants of food consumption. He showed that food demand patterns in the U.S. and Canada begin earlier and lead the trends observed in Western Europe. By correlating per capita changes in food and beverage consumption in Europe for the period 1984-1989 with identical changes in the U.S. for three periods, he found that, while current changes are not correlated, prior U.S. changes are positively associated with the changes in Europe during 1984-1989. His conclusion is that changes in per capita food expenditures in Northern America are observed with a delay in Europe. In this sense Northern America anticipates the European patterns.

The attention paid to the convergence of food consumption is relatively disproportionate. Other topics have been relatively unexplored. This is likely due to the problem of data availability. Even though changes in final demand play a relevant role in food systems and work as a crucial determinant of their evolution, it would be interesting to examine more directly and systematically the existence of convergence for other dimensions and variables such as market structure, firms' strategies, and their determinants. In other terms, all the dimensions suggested, for example, by the *S-C-P* paradigm or by the theoretical framework of Porter's "diamond" could provide useful directions of research.

In this regard, it is interesting to note that some recent attempts to revise Porter's framework, in order to go beyond its essentially static nature, have focused on the convergence of the "diamond" among most advanced countries. Narula (1993) hypothesized that at the stage of development of more industrialized countries the "diamonds" of individual countries have converged, in the sense that these countries possess similar competitive advantages in technology, an increasing homogeneity of social and demand conditions, and similar market structures. However, up to now, research on these topics has been rather scattered in general, as well as in the case of food systems. Particular attention should be paid to the convergence of retailing's competitive environments. These topics should be treated more extensively, given the consequences of concentration in retailing in terms of increasing bargaining power of retailers and changes of vertical relationships between manufacturers and retailers. I briefly touch these issues later on, so I will restrict myself to pointing out that we need a more systematic analysis in terms of international comparison.

Surely, we don't need sophisticated analyses to predict and show that the food systems of advanced countries are converging (in a broad sense). Since these countries tend to be characterized by the same Porter diamonds, there is no surprise of the existence of common trends.

However, we should not regard the broad notion of convergence as a trivial one. In fact, it can provide interesting topics to academic researchers, as well as useful information to public policies and firms' strategies.² In this regard, it should be noted that even among advanced countries there are countries with rather different per capita income levels or with differences in the evolutive stage of their food system.

The knowledge about what happened and is happening in the food system of leading countries may be crucial to develop appropriate national policies and successful firm strategies through approaches of "learning by seeing." As a consequence, deeper investigations about the stylized facts of convergence and a better understanding of the mechanisms which tend to accelerate or slow these processes might be highly fruitful.

However, it is also important to reflect on the limits of this notion of convergence. The analyses based on it can only focus on the mere existence of the same direction of change. New relevant directions of research emerge if we define convergence in a strict sense.

As already indicated, it seems important to distinguish between a *broad* and a *narrow* notion of convergence. The notion of narrow convergence focuses on the relative intensity of changes, that is on the pace and rate of convergence. The issues suggested by a narrow notion are more complex. Both the existence, as an empirical fact, of this type of convergence as well as its determinants need more sophisticated approaches and analyses. This means that a narrow notion provides new insights and

directions of research. For example, it might be interesting to see whether convergence leads to parallel transition of food systems in the sense that their evolution goes on along parallel trajectories while the systems remain distinct. Or whether convergence means that the food systems of different countries tend to look very much alike and increasingly homogeneous.

A crucial reference in this regard is provided by the recent literature on the existence of long-run convergence and catching-up processes in economic performance (Barro and Sala-i-Martin 1991, 1992). The so-called Convergence Hypothesis has explored the existence of a tendency for per capita income levels to narrow over time. The theoretical and empirical interest in this literature derives from the debate about the predictions of two branches of growth theory. Neoclassical growth models of the standard Solow-type and the extensions which “augment” the standard model with human capital imply some form of convergent behaviour.

The recent “new growth” literature with its models of endogenous growth (see, for example, Romer 1986 and Rebelo 1991) has different implications. These models are characterized by the absence of diminishing returns in physical and human capital and do not exhibit the convergence property. This literature defined two different, even if related, measures of convergence, such as the notion of β -convergence and σ -convergence. The approach to measure β -convergence consists in estimating the regression of growth rates of real *per capita* GDP (g) on the logarithm of country’s income level ($\log y$) for a cross-section of countries:

$$(1) \quad g = \alpha - \beta \log(y) + \epsilon,$$

if $\beta > 0$, there is β -convergence. It clearly occurs when lower income economies tend to grow faster than higher income ones.³ The concept of σ -convergence is defined as a reduction in the cross-section standard deviation over time. For example, if for a group of countries the dispersion of their real per-capita GDP levels tends to decrease over time, that is, if:

$$(2) \quad \sigma_{t+T} < \sigma_t$$

where σ_t is the time t standard deviation of $\log(y)$ across the countries, they are converging in the sense of σ .

This literature is a useful reference since it has developed rigorous theoretical frameworks and sophisticated empirical work.⁴ In addition, its usefulness is increasing as a consequence of some recent developments. Until quite recently, in fact, this literature had focused almost exclusively on macro-economic variables such as per capita income levels or convergence in aggregate measures of productivity. Some recent works have developed more disaggregated analyses and emphasized the role of factors such as technology. These developments are stimulated by the fact that the focus on aggregate outcomes might mask the variation in sectoral productivity movements. Bernard and Jones (1996), for example, find evidence of substantial heterogeneity of productivity movements across sectors. They show that within sectors across countries there is evidence for convergence for some industries, but not for others. This clearly implies the need for more detailed and focused analysis. While it is important to examine whether differences across sectors account for convergence at the national level, it seems apparent that these developments tend to stress the relevance of more disaggregated analyses at the level of single industry.

Obviously, the more sophisticated and disaggregated the approach, the more serious is the problem of data availability. In any case, concepts and measures of convergence defined by this literature suggest new approaches to the analysis of food systems convergence.

It is interesting to see that the conceptual framework and some empirical measures suggested by the convergence literature have been already used in some recent analyses on the convergence of food consumption patterns in European countries (see, for example, Gil et al. 1995, Hermann and Roder

1995). It is also interesting to note that, even in the case of narrow convergence, as already noted for broad convergence, the initial work has developed on the convergence of consumption patterns. The work in this area should be extended.

We should develop theoretical and conceptual frameworks able to include some specific characteristics of food systems in order to explore specific theories of food systems convergence and specific predictions for the empirical analysis of convergence. At the same time, more sophisticated empirical research based on the definition and measures of convergence should and could be pursued for several structural and behavioural variables of interest for the food systems. Ideally, we might obtain interesting developments by the interaction of theoretical work on the determinants of convergence of food systems as well as by the availability of more accurate definitions and measures of the relevant empirical regularities. After all, this is the same interaction which has been at work in determining the main developments of the convergence literature.

In any case, at least for some variables, more systematic work on the existence not only of broad convergence but of convergence in a narrow sense seems worthwhile. The main problem in analyzing these issues is the weakness of the data available to researchers so that development of adequate data sets should be encouraged.

The Convergence in R&D Expenditures

The above discussion suggests examining the issue of convergence by focusing on a narrow concept of convergence and extending the analyses beyond the issue of convergence in food consumption. Even if data sets with which to analyze the convergence of structural and behavioural variables are a serious bottleneck, some work is already possible.

To illustrate the point, let me consider the issue of convergence in research and development expenditures in a cross-country sample of OECD countries. Given the incremental nature of innovation in the food industries, the intensity of R&D is a rather partial proxy of innovative performance in these industries and presents some limits when used to evaluate the relevance of food innovation relative to other manufacturing sectors (Galizzi and Venturini 1995). However, it makes sense to use such an intensity as an indicator of innovative performance in cross-country comparisons.

There is empirical evidence that the R&D intensity of the food industry tends to increase in all advanced countries (see, for example, Traill 1989). Clearly, such patterns indicate the existence of a process of broad convergence. But do they reveal also a process of catching-up?

A simple way to explore the issue is to calculate the standard deviation of the cross-country distribution of R&D intensity. The R&D intensity of the food industries did not converge among the OECD countries over the period 1985-1989. There are no statistical signs of σ -convergence over time. The standard deviation of the distribution has not decreased over the period considered.⁵ It would be interesting to explore the reasons of the absence of σ -convergence in the R&D expenditures of OECD countries.

Now, let me pay some attention to the Italian case. As we have seen, all advanced OECD countries, as a whole, have experienced an increase in R&D intensity over time or at least over the period considered. Even in Italy the food industry has increased the R&D expenditures in recent years.

Traditionally, R&D intensity in the Italian food industry has been very low, not only in absolute terms, but even relative to other Italian manufacturing industries. Since there is a positive relationship between the stage of development of a country and its R&D intensity in manufacturing, a lower intensity in a given industry for a laggard country does not have a particularly negative meaning since it reflects the different stage of development. The problem is more serious if such an intensity remains low when one controls for the country's stage of development. In other terms, the differences not explained by the stage of development should be cause for disquiet.

At the beginning of the 1980s, the position of the Italian food industry in terms of R&D intensity was very weak, even relative to its stage of development. Using a simple cross-country regression based on an equation where the dependent variable was R&D intensity and the independent one was per capita income, I found that the Italian food industry would have had to double intensity (a level of 0.08 percent instead of the actual 0.04 percent) in order to reach a R&D intensity consistent with the Italian per capita income (Venturini 1987).

The intensity of R&D in the Italian food industry doubled through the 1980s. Curiously, it just increased from 0.04 percent at the beginning to 0.10 percent at the end of the period. Such a pattern clearly indicates that some changes are going on in the Italian food system, leading to a stronger emphasis on non-price strategies such as product innovation and vertical differentiation.

These patterns are quite consistent with a broad notion of convergence in the sense that they denote a competitive environment more oriented to innovation. The interesting issue is to see whether they might pass even a test of narrow convergence. To see this, I used the same approach indicated above by estimating two cross-countries equations where the dependent variable is R&D intensity (RDI) and the independent variable is the level of the stage of development of each country as measured by per capita income (PCY). Equation (3) presents the results of an OLS estimate for the year 1985, while equation (4) repeats the estimate for 1989:

$$\begin{array}{ll}
 \text{RDI} & = \alpha + \beta \text{ PCY} + \epsilon \\
 \text{coef.} & 0.049 + 0.169 \quad R^2: 0.179 \\
 \text{t-test} & (1.685)
 \end{array}
 \tag{3}$$

$$\begin{array}{ll}
 \text{RDI} & = \alpha + \beta \text{ PCY} + \epsilon \\
 \text{coef.} & -0.024 + 0.149 \quad R^2: 0.429 \\
 \text{t-test} & (3.242)
 \end{array}
 \tag{4}$$

The analysis of the residuals of these two estimated equations reveals that while the actual R&D intensity for Italy was 0.08 in 1985, the intensity predicted by the estimated equation (equation 3) is 0.18. From equation (4), the estimated intensity in 1989 is 0.27 percent while the actual value is 0.10.

These results seem to indicate that the relative position of the Italian food industry has not changed. Notwithstanding the relevant increase in R&D intensity, the Italian food industry did not catch up over the considered period. There is no room now to go into the details of this issue. It will suffice to say that there is empirical evidence that a crucial determinant of the Italian weakness in non-price strategies depends on the fragmented structure of retailing. Even if concentration levels increased over the last years, the Italian retailing structure is still rather fragmented and lags behind the other advanced countries. These structural characteristics are the result of a government regulation which has blocked the entry of large retailers and new formats, slowing the development of inter-type and non-price competition in retailing. The crucial issue is that in a competitive environment characterized by concentrated retailing, manufacturers face stronger incentives to innovate and strengthen their brands and to increase R&D (and marketing expenditures). These pressures were rather weak for the Italian food manufacturers because of the fragmented structure of domestic retailing and this weakness might explain the absolute and relative permanence of the low levels in R&D expenditures in Italy.

This hypothesis and the importance that it gives to the role of retailers helps me to introduce a further area where research about convergence seems very worthy of more attention. Retailers' bargaining power and their non-price strategies have several far reaching implications. There is the case, for example, of retailers' private-label programs. Their diffusion is a quite general phenomenon. In every country, at a certain stage of development of the retailing competitive environment, the appearance of private-label products and the emerging of vertical competition is a well-known empirical regularity. However, it seems quite important to see whether there are differences in the nature of vertical relationships and in the intensity of vertical competition among countries.

In this regard, Cotterill (1995) has pointed out that the U.K. and the U.S. represent two different models. According to the U.K. model relatively few large retailers serve as marketing channel captains. They aggressively market their own brands which often tend to become leading brands in the product category with quite significant market share. On the contrary, in the U.S. model large multi-brand firms exert a strong control over the marketing channel and the market share of private-label products is much lower.

Cotterill takes as given that food systems in developed economies will converge to a common set of manufacturing and distribution technologies and to a fairly common set of firms strategies both in manufacturing and retailing but argued that the U.S. model will dominate. The persistence of these two different models would mean the absence of a process of narrow convergence. As a consequence, the market share of private-label products would remain lower in the U.S. Analogously, it is interesting to see whether processes of (narrow) convergence towards the U.K. model are going on within Europe as well.

These issues also provide an interesting area of research because important behavioral and structural consequences depend on the nature of vertical relationships between manufacturers and retailers. As we have seen, in order to maintain their competitive advantage and successfully face the competition of aggressive private label products, the leading firms react by increasing their marketing and R&D expenditures. This means higher sunk fixed costs, a shift in the minimum efficient size of firms, and hence more concentrated markets. At the same time, the diffusion of private-labels might determine a deconcentration effect whenever these products are manufactured by specialized firms smaller than the major firms selling national brands. In this case, higher private-label market shares imply more room for small-medium sized firms and consequently an erosion of leading firms' market shares. However, this hypothesis about the possible existence of a deconcentration effect collapses if larger manufacturers adopt dual-branding strategies. In other words, the consequences of vertical relationships are quite complex and might change over time.

Recently, the hypothesis that the nature of vertical relationships between manufacturers and retailers, particularly the phenomenon of vertical competition, might influence market structure has stimulated some theoretical and empirical research (Venturini 1993, 1994, Connor 1994, Galizzi et al. 1995). Clearly, we need more work about the determinants of inter-industry diffusion of private-label products as well as the development of cross-country analysis of their consequences.

More systematic work along the lines suggested by the theme and notions of convergence, particularly if we focus on topics of narrow convergence, would be interesting. Obviously, the questions suggested by the notion of narrow convergence are much more difficult to examine. We have to go into detailed analysis based on rigorous modeling and empirically testable hypothesis. However, there seem to be enough reasons to warrant active research in this area. A major emphasis and more systematic research on the issues of convergence of food systems will contribute to several new insights, and focus on new topics and interesting issues.

Notes

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²Connor (1994), for example, hypothesized that European food firms might be interested in obtaining U.S. food expenditure growth data in order to predict European food-expenditure trends (p. 168).

³This concept of convergence is called the absolute β -convergence hypothesis. Two further concepts are the hypothesis of conditional β -convergence, when per capita incomes of countries with identical structural characteristics converge independently of their initial conditions, and the club convergence

hypothesis if per capita incomes of identical countries converge in the long-run provided that their initial conditions are similar as well.

⁴The empirical rejection of the absolute convergence hypothesis led the theorists of the endogenous growth literature to reject the neoclassical growth model. Further developments showed that the neoclassical growth paradigm generates the club convergence hypothesis as well as the conditional convergence hypothesis. Thus, rejection of the absolute convergence hypothesis does not imply rejection of the neoclassical growth model.

⁵The lack of data was a serious bottleneck for development of the convergence literature. In fact, a crucial stimulus to focus the issue was the availability of new data sets with information on income levels for many countries and long periods of time.

⁶Patel and Pavitt (1994) examined the patterns in industry financed R&D as a percentage of GDP in 17 OECD countries over the period 1967-1991. Their results indicate the absence of a technological convergence among these countries.

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